Attorney Docket No. 7701
Customer Number: 49459



## REMARKS

Applicants submit this Response to Office Action in reply to the Office Action dated April 17, 2006. Claims 1 to 21 are pending in this Application. Applicants have amended Claims 1, 18, and 20 to clarify the elements of those claims and not for reasons related to patentability. Applicants have amended the Specification to correct minor grammatical errors.

Applicants submit herewith a Declaration under 37 C.F.R. § 1.132 traversing the rejections set forth below, which contains objective evidence of unexpected results, commercial success, and long-felt but unsolved needs.

The Office Action rejected Claims 1 to 21 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,762,832 B2 to Fisher et al. ("Fisher") in view of U.S. Patent No. 5,278,074 to Rao et al. ("Rao").

Fisher discloses a method for monitoring the concentration of a component in a composition in semiconductor processing. Fisher unequivocally states that the method "operates on the basis of light absorption." (Fisher, col. 3, lines 28 to 30). The method includes measuring the light absorbance of a sample of the composition to determine the concentration of the component in the composition based on the absorption measurement. The concentration of the component can be adjusted to a desired level.

Rao discloses a method of measuring the concentration of a corrosion inhibitor in industrial water systems by fluorescence monitoring. Rao provides exemplary water systems including boilers, cooling water systems, and other water streams, in particular industrial scale water streams. The method includes fluorometrically monitoring the concentration of an aromatic azole corrosion inhibitor in an industrial water system and adjusting the concentration of the azole based on the monitored fluorescence.

Amended Claim 1 (and Claims 2 to 17 and 19 that depend therefrom) is directed to a method of inhibiting corrosion of copper plated or metallized surfaces and circuitry in semiconductor devices immersed in an ultrapure aqueous fluid in a treatment bath. The

method includes adding to the aqueous fluid an effective corrosion inhibiting amount of one or more aromatic triazole corrosion inhibitors and fluorometrically monitoring the concentration of aromatic triazole corrosion inhibitors in the aqueous fluid. The method further includes adding additional aromatic triazole corrosion inhibitor to the aqueous fluid to maintain an effective corrosion inhibiting concentration of the aromatic triazole corrosion inhibitor in the aqueous fluid.

Amended Claim 18 relates to a treatment bath for copper plated or metallized semiconductor devices including an inlet and an outlet. Among other elements, this claim includes a monitoring and control means including a flowcell installed in the fluid transfer line for fluorometrically determining the concentration of the aromatic triazole corrosion inhibitor in the ultrapure aqueous fluid.

Amended Claim 20 (and Claim 21 that depends therefrom) is directed to a treatment bath for copper plated or metallized semiconductor devices including an inlet, an outlet, and a side-stream sample line. Among other elements, this claim includes a monitoring and control means including a flowcell installed in the side-stream sample line for fluorometrically determining the concentration of aromatic triazole corrosion inhibitor in the ultrapure aqueous fluid.

Fisher in view of Rao does not disclose, teach, or suggest a method of inhibiting corrosion of copper plated or metallized surfaces and circuitry in semiconductor devices immersed in an ultrapure aqueous fluid in a treatment bath by fluorometrically monitoring the concentration of an aromatic triazole in the aqueous fluid. Nor does Fisher in view of Rao disclose, teach, or suggest a treatment bath for copper plated or metallized semiconductor devices having a having a monitoring and control means for fluorometrically determining the concentration of aromatic triazole corrosion inhibitor in an ultrapure fluid. Instead, Fisher discloses a method of determining concentration of a component based on light absorption. Rao discloses a method of fluorometrically monitoring the concentration of a triazole corrosion inhibitor in water systems including boilers, cooling water systems, and other water streams, in particular industrial scale water streams.

The Office Action states, "It would have been obvious to one of ordinary skill in the art to substitute the fluorescent measurement/monitoring taught by Rao for the spectroscopic monitoring in the control system of Fisher." (page 4). As set forth in the concurrently submitted Declaration, high purity fluids as in microelectronics applications present unique challenges for fluorometric determination of corrosion inhibitor concentration. It is simply not a matter of "substituting" one measurement metrology for another. As such, testing revealed unexpected results and significant testing of flowcells, excitation/emission combinations, pH variation issues, and triazole chemistries had to be done to determine suitable conditions.

The Office Action further states that fluorescent and spectroscopic "techniques are clearly functional equivalents, and clearly achieve the same result." (page 4). To the contrary, Applicants have set forth in the concurrently submitted Declaration, high light absorbance levels and fluorescence quenching can adversely impact accurate fluorescence measurements. Fluorescence is capable of accurately measuring triazole concentration at dosage levels of 2 to 3 orders of magnitude (i.e., 100 to 1000-fold) lower than light absorbance techniques. Hence, where it was not possible to accurately measure triazole dosage with light absorbance of previous designs, it is possible with the current fluorescence technique.

The Office Action also states that Applicants have failed to show the "fluorescence technique would not work in an ultrapure system." (page 5). To the contrary, Applicants' Declaration sets forth that the fluorescence technique works in an ultrapure system only after significant testing including operating parameters, design and testing of new measurement devices, and determining variations involving pH fluctuations due to the absence of pH buffers in such systems.

Moreover, Applicants submit herewith evidence, in the form of a Declaration, of unexpected results (described above), commercial success, industry acceptance, and that the invention has filled a long-felt but unsolved need. Conversations with several industry experts revealed a long-felt need for a simple, accurate triazole concentration measurement method. Prior to the present invention, other methods were cumbersome (multiple reagents

needed) and substantially challenging and difficult to implement the measurement device into the system. Applicants have heard numerous and consistent comments regarding the ease of installation, integration, operation and superior accuracy of the metrology of the present invention, as compared to previously available metrologies. Microelectronics facilities that have used other metrologies have conveyed that the fluorescence technique of the present invention has filled a long-felt but unsolved need.

Therefore, Applicants assert that the objective evidence of nonobviousness presented above and in the enclosed Declaration patentably distinguish Amended Claim 1 (and Claims 2 to 17 and 19 that depend therefrom), Amended Claim 18, and Amended Claim 20 (and Claim 21 that depends therefrom) from Fisher in view of Rao and place in these claims in condition for allowance. Applicants respectfully request that this rejection be withdrawn.

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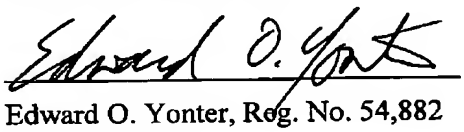
## CONCLUSION

Applicants submit that based upon the above Amendments, Remarks, and Declaration all pending claims are in condition for allowance and respectfully request that a Notice of Allowance be sent for this Application. Early consideration of this matter is earnestly solicited.

Respectfully Submitted,



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